

EDUCATION:

Bachelor of Science, Zoology
(Fisheries Biology; Environmental Physiology, Comparative Biochemistry)
University of British Columbia, 1982

SPECIALIZATION:

Principal of MacDonald Environmental Sciences Limited, which was established to provide scientific consulting services in the fields of fisheries and aquatic resource management, stream ecology, environmental quality guidelines and policy development, environmental risk and hazard assessment, and information and technology transfer.

Specialist environmental toxicology and chemistry, ecosystem-based resource management, water quality/water use interactions, and sediment quality assessment.

PROFESSIONAL MEMBERSHIPS:

American Fisheries Society
President Western Division; Past-President, Canadian Aquatic Resources Section; Nominations Committee; Chair, Wetlands Conservation Committee; Newsletter Committee; Membership Committee.
Aquaculture Association of Canada
Association of Professional Biologists of British Columbia
Canadian Association on Water Pollution Research and Control
International Association on Water Pollution Research and Control
Society of Environmental Toxicology and Chemistry

OTHER PROFESSIONAL ACTIVITIES:

1986-1988 Newsletter Editor, North Pacific International Chapter, American Fisheries Society
1987-1989 Chair, Membership Committee, North Pacific International Chapter, American Fisheries Society
1992-1994 Chair, Wetlands Conservation Committee, Canadian Aquatic Resources Section, American Fisheries Society
1990-1994 Vice-President, President-Elect, President, and Past-President, Canadian Aquatic Resources Section, American Fisheries Society
1995-Present Canadian Director and Chair, Board of Directors, Sustainable Fisheries Foundation
1997-2001 Vice-President, President-Elect, President, and Past-President, Western Division, American Fisheries Society
2000-2001 Member, Membership Committee, American Fisheries Society
2003-2006 Award of Excellence Committee, American Fisheries Society
2005-2006 Member, Science Advisory Board for Contaminated Sites in British Columbia
2006-Present Board of Directors, Mid-Island Science, Technology & Innovation Council (MISTIC)

PROFESSIONAL CERTIFICATIONS:

Fisheries Professional-Certified (American Fisheries Society)
Registered Professional Biologist (Association of Professional Biologists of British Columbia)

EXPERIENCE:

AQUATIC BIOLOGIST - February 1989 to Present

MacDonald Environmental Sciences Limited, #24 - 4800 Island Highway North, Nanaimo, B.C. V9T 1W6 Independent consulting on environmental impact assessment, natural resource damage assessment, ecological risk assessment, fisheries and aquatic resource management, environmental quality, stream ecology, computer data management, and information and technology transfer. Projects include the development of water quality guidelines, sediment quality guidelines, tissue residue guidelines, environmental quality monitoring programs, fisheries co-management programs, ecosystem-based management, ecological risk assessments, natural resource damage assessments, and the assessment of environmental quality.

WATER QUALITY OBJECTIVES OFFICER - September 1984 to February 1989

Water Quality Branch, Inland Waters, Environment Canada, 502 - 1001 West Pender Street, Vancouver, B.C. V6E 2M9 Compilation, management and statistical analysis of existing and new information generated to support the formulation of water quality objectives in waters of significant federal interest; generation of water quality criteria information through toxicological, water quality, and other studies; design and implementation of monitoring programs to assess compliance with water quality objectives; preparation of reports and other publications on information developed to formulate water quality objectives; organization of workshops and information exchange sessions on water quality guidelines and objectives; provision of information and advice to technical committees established to resolve the International Joint Commission reference on the Flathead River. Supervisor: Dr. D. Valiela, Head Water Quality Objectives Division

TECHNICAL PLANNING COORDINATOR - November 1983 to September 1984

Water Quality Branch, Inland Waters, Environment Canada, 502 - 1001 West Pender Street, Vancouver, B.C. V6E 2M9 Planning and development of regional water quality programs, including long- and short-term logistics and budgetary requirements and inter-project coordination; planning, organization, expedition, and supervision of special field studies and sampling projects for water quality analysis; pollution surveillance and sediment sampling; planning and implementation on national water quality monitoring programs to assess national trends and conditions. Supervisor: Dr. W.E. Erlebach, Chief Water Quality Branch

PUBLICATIONS AND TECHNICAL REPORTS:*Journal/Book Publications*

- MacDonald D.D., D. Moore D, C.G. Ingersoll, D.E. Smorong, R.S. Carr, R. Gouguet, D. Charters, D. Wilson, T. Harris, J. Rauscher, S. Roddy, and J. Meyer. 2011. Baseline ecological risk assessment of the Calcasieu Estuary, Louisiana: 1. Overview and problem formulation. *Archives of Environmental Contamination and Toxicology*. In review
- MacDonald D.D., C.G. Ingersoll, D.E. Smorong, J.A. Sinclair, R.A. Lindskoog, N. Wang, C. Severn, R. Gouguet, J. Meyer, and J. Field. 2011. Baseline ecological risk assessment of the Calcasieu Estuary, Louisiana: 2. An evaluation of the predictive ability of effects-based sediment quality guidelines. *Archives of Environmental Contamination and Toxicology*. In press.
- MacDonald D.D., C.B. Ingersoll, N. Kemble, D.E. Smorong, J.A. Sinclair, R.A. Lindskoog, C. Gaston, D. Sanger, S. Carr, J. Biedenbach, R. Gouguet, J. Kern, A. Shortelle, J. Field, and J. Meyer. 2011. Baseline Ecological Risk Assessment of the Calcasieu Estuary, Louisiana: 3. An Evaluation of the Risks to Benthic Invertebrates Associated with Exposure to Contaminated Sediments. *Archives of Environmental Contamination and Toxicology*. In press.
- MacDonald D.D and C.G. Ingersoll. 2010. Tools for assessing contaminated sediments in freshwater, estuarine, and marine ecosystems. *In: Sedimentology of Aqueous Systems*, 1st edition, C. Poletto, S. Charlesworth editors. Blackwell Publishing. Boston Massachusetts.
- Clark, M.J.R., D.D. MacDonald, P.H. Whitfield, and M.P. Wong. 2010. Designing monitoring programs for water quality based on experience in Canada. Part II - Monitoring Tools - Problem Characterization and Data Quality Objectives. *Trends in Analytical Chemistry* 29(5):385-398.
- MacDonald, D.D., M.J.R. Clark, P.H. Whitfield, and M.P. Wong. 2009. Using water sampling for decision making for status and trends: Part III - Ecosystem Based Management and Water Quality Objectives - Problem Characterization and Data Quality Objectives. In Review.
- MacDonald, D.D. M.J.R. Clark, P.H. Whitfield, and M.P. Wong. 2009. Designing monitoring programs for water quality based on experience in Canada I. Theory and framework. *Trends in Analytical Chemistry* 28(2):204-213.
- Ingersoll, C.G., N.E. Kemble, J.L. Kunz,, W.G. Brumbaugh, D.D. MacDonald, and D. Smorong. 2009. Toxicity of sediment cores collected from the Ashtabula River in Northeastern Ohio, USA, to the amphipod *Hyaletella azteca*. *Archives of Environmental Contamination and Toxicology* 57(2):315-329.
- Bay, S.M., W. Berry, P. Chapman, R. Fairey, T. Gries, E. Long, D. MacDonald, and S. Weisberg. 2007. Evaluating consistency of best professional judgment in the

application of a multiple lines of evidence sediment quality triad. *Integrated Environmental Assessment and Management* 3(4):491-497.

Long E.R., C.G. Ingersoll, and D.D. MacDonald. 2006. Calculation and uses of mean sediment quality guidelines: A critical review. *Environmental Science and Technology* 40(6):1726-1736.

Ingersoll, C.G., S.M. Bay, J.L. Crane, L.J. Field, T.H. Gries, J.L. Hyland, E.R. Long, D.D. MacDonald, and T.P. O'Connor. 2005. Ability of sediment quality guidelines to estimate effects or no effects of sediment-associated contaminants in laboratory toxicity tests or in benthic community assessments. *In: Wenning RJ, Batley G, Ingersoll CG, editors. Use of sediment quality guidelines (SQGs) and related tools for the assessment of contaminated sediments. 497-556. SETAC Press. Pensacola Florida.*

MacDonald, D.D., R.S. Carr, D. Eckenrod, H. Greening, S. Grabe, C.G. Ingersoll, S. Janicki, R.A. Lindskoog, E.R. Long, R. Pribble, G. Sloane, and D.E. Smorong. 2004. Development, evaluation and application of sediment quality targets for assessing and managing contaminated sediments in Tampa Bay, Florida. *Archives of Environmental Contamination and Toxicology* 46(2):147-161.

Knudsen, E.E., D.D. MacDonald, and Y.K. Muirhead, editors. 2004. Sustainable management of North American fisheries. American Fisheries Society, Symposium 43, Bethesda, Maryland.

Carr, R.S., J.M. Biedenbach, and D.D. MacDonald. 2003. Comparison of sediment quality guideline values derived using sea urchin porewater toxicity test data with existing guidelines. *In: Porewater Toxicity Testing: Biological, Chemical, and Ecological Considerations R.S. Carr and M. Nipper (Eds). Setac Press. Pensacola, Florida.*

Crane, J.L. and D.D. MacDonald. 2003. Applications of numerical sediment quality targets for assessing sediment quality conditions in a U.S. Great Lakes Area of Concern. *Environmental Management* 32(1):128-140.

Nipper, M. R.S. Carr, W.J. Adams, W.J. Berry, G.A. Burton Jr., K.T. Ho. D.D. MacDonald, R. Scroggins, and P.V. Winger. 2003. Recommendations for research related to biological, chemical, and ecological aspects of sediment pore water: The way forward. *In: Porewater Toxicity Testing: Biological, Chemical, and Ecological Considerations R.S. Carr and M. Nipper (Eds). Setac Press. Pensacola, Florida.*

MacDonald, D.D., C.G. Ingersoll, D.E. Smorong, R.A. Lindskoog, D.W. Sparks, J.R. Smith, T.P. Simon, and M.A. Hanacek. 2002. Assessment of injury to fish and wildlife resources in the Grand Calumet River and Indiana Harbor area of concern. *Archives of Environmental Contamination and Toxicology* 43:130-140.

MacDonald, D.D., M.A. Hanacek and L. Genn. 2002. Salmon, society and politics: The potential for ecosystem-based management of pacific salmon. *In: Sustaining North American Salmon: Perspectives Across Regions and Disciplines. American Fisheries Society.*

- MacDonald, D.D., C.G. Ingersoll, D.E. Smorong, R.A. Lindskoog, D.W. Sparks, J.R. Smith, T.P. Simon, and M.A. Hanacek. 2002. An assessment of injury to sediments and sediment-dwelling organisms in the Grand Calumet River and Indiana Harbor area of concern. *Archives of Environmental Contamination and Toxicology* 43:141-155.
- Crane, J.L., D.D. MacDonald, C.G. Ingersoll, D.E. Smorong, R.A. Lindskoog, C.G. Severn, T.A. Berger, and L.J. Field. 2002. Evaluation of numerical sediment quality targets for the St. Louis River area of concern. *Archives of Environmental Contamination and Toxicology* 43:1-10.
- Ingersoll, C.G., D.D. MacDonald, W.G. Brumbaugh, B.T. Johnson, N.E. Kemble, J.L. Kunz, T.W. May, N. Wang, J.R. Smith, D.W. Sparks, and S.D. Ireland. 2002. Toxicity assessment of sediments from the Grand Calumet River and Indiana Harbor Canal in northwestern Indiana. *Archives of Environmental Contamination and Toxicology* 43:156-167.
- Field, L.J., D.D. MacDonald, S.B. Norton, C.G. Ingersoll, C.G. Severn, D. Smorong, and R. Lindskoog. 2002. Predicting amphipod toxicity from sediment chemistry using logistic regression models. *Environmental Toxicology and Chemistry* 21(9):1993-2005.
- Ingersoll C.G., D.D. MacDonald, N. Wang, J.L. Crane, L.J. Field, P.S. Haverland, N.E. Kemble, R.A. Lindskoog, C.G. Severn, and D.E. Smorong. 2001. Predictions of sediment toxicity using consensus-based freshwater sediment quality guidelines. *Archives of Environmental Contamination and Toxicology*. *Archives of Environmental Contamination and Toxicology* 41:8-21.
- MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20-31.
- MacDonald, D.D., C.R. Steward, and E.E. Knudsen. 2000. One Northwest Community - People, Salmon, Rivers, and the Sea: Towards Sustainable Fisheries. *In*: E.E. Knudsen, C.R. Steward, D.D. MacDonald, J.E. Williams, and D.W. Reiser (Eds.). *Sustainable Fisheries Management: Pacific Salmon*. CRC Press. Boca Raton, Florida.
- MacDonald, D.D., L.M. DiPinto, J. Field, C.G. Ingersoll, E.R. Long, and R.C. Swartz. 2000. Development and evaluation of consensus-based sediment effect concentrations for polychlorinated biphenyls (PCBs). *Environmental Toxicology and Chemistry* 19:1403-1413.
- Kemble, N.E., D.G. Hardesty, C.G. Ingersoll, B.T. Johnson, F.J. Dwyer, and D.D. MacDonald. 2000. An evaluation of the toxicity of contaminated sediments from Waukegan Harbor, Illinois following remediation. *Archives of Environmental Contamination and Toxicology* 39:452-461.
- Knudsen, E.E., D.D. MacDonald, C.R. Steward. 2000. Setting the Stage for a Sustainable Pacific Salmon Fisheries Strategy. *In*: E.E. Knudsen, C.R. Steward, D.D. MacDonald, J.E. Williams, and D.W. Reiser (Eds.). *Sustainable Fisheries Management: Pacific Salmon*. CRC Press. Boca Raton, Florida.

- Knudsen, E.E., C.R. Steward, D.D. MacDonald, J.E. Williams, and D.W. Reiser (Eds.). 2000. Sustainable Fisheries Management: Pacific Salmon. CRC Press. Boca Raton, Florida.
- Long, E.R., D.D. MacDonald, C.G. Severn, and C.B. Hong. 2000. Short Communication. Classifying probabilities of acute toxicity in marine sediments with empirically derived sediment quality guidelines. *Environmental Toxicology and Chemistry* 19(10):2598-2601.
- Field, L.J., D.D. MacDonald, S.B. Norton, C.G. Severn, and C.G. Ingersoll. 1999. Evaluating sediment chemistry and toxicity data using logistic regression modelling. *Environmental Toxicology and Chemistry* 18(6):1311-1322.
- Milburn, D., D.D. MacDonald, T.D. Prowse, and J.M. Culp. 1999. Ecosystem Maintenance Indicators for the Slave River Delta, Northwest Territories, Canada. *In*: Y.A. Pykh, D.E. Hyatt, and R.J.M. Lenz (Eds.). *Environmental Indices: Systems Analysis Approach*. ISBN 0 9534944 0 3. EOLSS Publishers Co. Ltd. Oxford, United Kingdom.
- MacDonald, D.D., M.G. Ikonou, A.-L. Rantalainen, I.H. Rogers, D. Sutherland, J. Van Oostdam. 1998. Contaminants in white sturgeon (*Acipenser transmontanus*) from the Upper Fraser River, British Columbia. *Environmental Toxicology and Chemistry* 16(3):479-490.
- Long, E.R. and D.D. MacDonald. 1998. Recommended uses of empirically derived, sediment quality guidelines for marine and estuarine ecosystems. *Human and Ecological Risk Assessment* 4(5):1019-1039.
- Long, E.R., D.D. MacDonald, J.C. Cabbage, and C.G. Ingersoll. 1998. Predicting the toxicity of sediment-associated trace metals with SEM:AVS concentrations and dry weight-normalized concentrations - A critical comparison. *Environmental Toxicology and Chemistry* 17(5):972-974.
- Long, E.R., L.J. Field, and D.D. MacDonald. 1998. Predicting toxicity in marine sediments with numerical sediment quality guidelines. *Environmental Toxicology and Chemistry* 17(4):714-727.
- Ingersoll, C.G., G.T. Ankley, R. Baudo, G.A. Burton, W. Lick, S.N. Luoma, D.D. MacDonald, T.B. Reynoldson, K.R. Solomon, R.C. Swartz, and W.J. Warren-Hicks. 1997. Workgroup summary report on uncertainty evaluation of measurement endpoints used in sediment ecological risk assessment. *In*: C.G. Ingersoll, T. Dillon, and G.R. Biddinger (Eds.). *Ecological Risk Assessment of Contaminated Sediments*. Pensacola Florida: SETAC Press p. 297-352.
- Solomon, K.R., G.T. Ankley, R. Baudo, G.A. Burton, C.G. Ingersoll, W. Lick, S. Luoma, D.D. MacDonald, T.B. Reynoldson, R.C. Swartz, W.J. Warren-Hicks. 1997. Workgroup summary report on methodological uncertainty in sediment ecological risk assessment. *In*: C.G. Ingersoll, T. Dillon, and R.G. Biddinger (Eds.). *Ecological Risk Assessment of Contaminated Sediment*. Pensacola Florida: SETAC Press. p. 271-296.
- Zarbock, H., J. Schulten, E. Long, and D.D. MacDonald. 1997. Sediment contamination in Tampa Bay: Sources, risks, and management. Tampa Bay BASIS3 Proceedings.

- MacDonald, D.D., R.S. Carr, F.D. Calder, E.R. Long, and C.G. Ingersoll. 1996. Development and evaluation of sediment quality guidelines for Florida coastal waters. *Ecotoxicology* 5:253-278.
- Smith, S.L., D.D. MacDonald, K.A. Keenleyside, C.L. Gaudet. 1996. The development and implementation of Canadian sediment quality guidelines. *In*: M. Munawar and G. Dave (Eds.). *Development and Progress in Sediment Quality Assessment: Rationale, Challenges, Techniques and Strategies*. Ecovision World Monograph Series. SPB Academic Publishing. Amsterdam. The Netherlands.
- Smith, S.L., D.D. MacDonald, K.A. Keenleyside, C.G. Ingersoll, and J. Field. 1996. A preliminary evaluation of sediment quality assessment values for freshwater ecosystems. *Journal of Great Lakes Research* 22(3):624-638.
- Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Journal of Environmental Management* 19(1):81-97.
- Porter, E.L., R.A. Kent, D.E. Andersen, K.A. Keenleyside, D. Milne, P. Cureton, S.L. Smith, K.G. Drouillard, and D.D. MacDonald. 1995. Development of proposed Canadian Environmental Quality Guidelines for cadmium. *Journal of Geochemical Exploration* 52:205-219.
- Outridge, P.M. and D.D. MacDonald. 1994. An evaluation of the ecological hazards associated with cadmium in the Canadian environment. *Environmental Reviews* 2:91-107.
- Powles, H. and D. MacDonald. 1994. Development of a Canadian office for the American Fisheries Society. *Fisheries* 19(2):30-31.
- Caux, P.-Y., R.A. Kent, G.T. Fan, C. Grande, and D.D. MacDonald. 1994. Aldicarb. *In*: P.Y. Caux and R.A. Kent (Eds.). *Canadian Water Quality Guidelines for Pesticides and Industrial Substances*. Canadian Association on Water Quality. Monograph Series No. 4:1-62.
- Caux, P.-Y., R.A. Kent, G.T. Fan, C. Grande, and D.D. MacDonald. 1994. Bromoxynil. *In*: P.Y. Caux and R.A. Kent (Eds.). *Canadian Water Quality Guidelines for Pesticides and Industrial Substances*. Canadian Association on Water Quality. Monograph Series No. 4:63-112.
- Caux, P.-Y., R.A. Kent, G.T. Fan, C. Grande, and D.D. MacDonald. 1994. Dimethoate. *In*: P.Y. Caux and R.A. Kent (Eds.). *Canadian Water Quality Guidelines for Pesticides and Industrial Substances*. Canadian Association on Water Quality. Monograph Series No. 4:113-164.
- Caux, P.-Y., R.A. Kent, G.T. Fan, and D.D. MacDonald. 1994. Protocols for deriving Canadian water quality guidelines for the protection of agricultural water uses. *Regulatory Toxicology and Pharmacology* 20:223-247.

Caux, P.-Y., R.A. Kent, M. Tache, C. Grande, G.T. Fan, and D.D. MacDonald. 1994. Environmental fate and effects of dicamba: A Canadian perspective. *Reviews of Environmental Contamination and Toxicology* 133:1-58.

MacDonald, D.D. and C.P. Newcombe. 1993. Effects of suspended sediments in aquatic ecosystems: A clarification of the stress index model. *North American Journal of Fisheries Management* 13(4):873-876.

Marshall, T.R. and D.D. MacDonald. 1992. Expanding the role of the American Fisheries Society in Canada: The issues, recent initiatives, and future strategies. *Fisheries* 17(4):28-31.

Newcombe, C.P. and D.D. MacDonald. 1991. Factors affecting the impacts of suspended sediments on aquatic ecosystems: Concentration and duration of exposure. *North American Journal of Fisheries Management* 11:72-82.

MacDonald, D.D. and T.R. Marshall. 1990. Canadian members of the AFS: Do we really belong? *Fisheries* 11(4):63-67.

MacDonald, D.D., D. Valiela, and S.J. Brown. 1988. Temporal variability of phosphorus levels in the Flathead River at the International Border Station. *Water Pollution Research Journal of Canada* 23(4):556-567.

MacDonald, D.D. and L.E. McDonald. 1987. The influence of surface coal-mining on potential salmonid spawning habitat in the Fording River, B.C. *Water Pollution Research Journal of Canada* 22(4):584-595.

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Technical Reports

MacDonald, D.D., J. Sinclair, M. Crawford, H. Prencipe and M. Meneghetti. 2011. Potential effects of contaminants on Fraser River sockeye salmon. MacDonald Environmental Sciences Ltd. Cohen Commission Tech. Rep. 2. In prep. Vancouver, British Columbia www.cohencommission.ca

MacDonald, G.L. Linder, C.G. Ingersoll, S.E. Finger, M.A. Crawford, H.J. Prencipe, J.A. Sinclair, M.B. Meneghetti, and J.E. Hinck. 2010. Handbook for Assessing Risks to Fish and Wildlife Associated with the Potential Use of Water, Treated Wastewater, Stormwater, Sediment, Soil, Biosolids, or Other Materials on Units of the National Wildlife Refuge System. Volume I: Overview of the Recommended Decision Framework. Prepared for U.S. Fish and Wildlife Service. Vancouver, Washington. Prepared by MacDonald Environmental Sciences Ltd., Nanaimo, British Columbia and United States Geological Survey, Columbia, Missouri.

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Stormwater, Sediment, Soil, Biosolids, or Other Materials on Units of the National Wildlife Refuge System. Volume II: Description of the Rapid (Tier 1) Assessment Process. Prepared for U.S. Fish and Wildlife Service. Vancouver, Washington. Prepared by MacDonald Environmental Sciences Ltd., Nanaimo, British Columbia and United States Geological Survey, Columbia, Missouri.

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MacDonald, D.D., P. Landrum, J. Sanderson, C. Lafontaine, M. Crawford, H. Prencipe, M. Meneghetti, M.L. Haines, A. Czarnecki, D. Smorong, O. Forest, and J. Smejkal. 2010. Status and Trends of Environmental Quality Conditions in the Transboundary Reach of the Slave River, NWT. Draft Report. Prepared for Indian and Northern Affairs Canada. Yellowknife, Northwest Territories. Prepared by MacDonald Environmental Sciences, Nanaimo, British Columbia. Landrum and Associates, Ann Arbor, Michigan. Indian and Northern Affairs Canada, Yellowknife, Northwest Territories.

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MacDonald, D.D. 2009. Guidelines for designing and implementing aquatic effects monitoring programs for development projects in the Northwest Territories: Volume 3 - Recommended procedures for developing data quality objectives and a conceptual study design. Prepared for Indian and Northern Affairs Canada. Water Resources Division. Yellowknife, Northwest Territories. Prepared by MacDonald Environmental Sciences Ltd. Nanaimo, British Columbia.

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Affairs Canada. Water Resources Division. Yellowknife, Northwest Territories.
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